

What is Claimed is:

1. A system for planning energy supply for energy consumers, said system comprising:
 - a first sub-system operatively associated with at least one energy coordinating body;
 - a second sub-system operatively associated with at least one energy supplier; and
 - a communication network between said first sub-system and said second sub-system,wherein each of said first and second sub-systems includes an interface for exchanging energy planning information between said sub-systems and for negotiating an energy supply specification from said at least one energy supplier to said energy consumers.
2. The system as recited in Claim 1, wherein said communication network includes a first local area network and a first ICCP server operatively associated with said first sub-system, a second local area network and a second ICCP server operatively associated with said second sub-system, and a global communication network between said first and second ICCP servers.
3. The system as recited in Claim 1, wherein said communication network is a global communication network.
4. The system as recited in Claim 3, wherein said global communication network is the Internet.
5. The system as recited in Claim 1, wherein said at least one energy coordinating body is an energy management system.
6. The system as recited in Claim 1, wherein said at least one energy supplier is a power plant.

7. The system as recited in Claim 1, wherein each of said first and second sub-systems includes a processor; and wherein the interface of each of said first and second sub-systems provides communications between said processors for automated optimization of energy supply planning.

8. The system as recited in Claim 7, wherein each of said interfaces exchanges at least two messages between said first and second sub-systems, said messages being related to negotiation of an energy supply specification from said at least one energy supplier for said energy consumers.

9. The system as recited in Claim 8, wherein a first pair of said messages comprises:

- a request for a proposal for said energy supply specification from said first sub-system to said second sub-system; and

- a proposal in response to said request for a proposal from said second sub-system to said first sub-system.

10. The system as recited in Claim 9, wherein a second pair of said messages comprises:

- an offer for an energy supply specification in response to said proposal from said first sub-system to said second sub-system, and

- an acceptance of said offer from said second sub-system to said first sub-system.

11. The system as recited in Claim 9, wherein a second pair of said messages comprises:

- an offer for an energy supply specification in response to said proposal from said first sub-system to said second sub-system, and

a counter offer for another energy supply specification from said second sub-system to said first sub-system.

12. The system as recited in Claim 8, wherein said energy supply specification includes a plurality of energy supply sub-specifications.

13. The system as recited in Claim 12, wherein each of said energy supply sub-specifications includes an attribute having a value and an importance value.

14. The system as recited in Claim 13, wherein each of said values is selected from the group comprising: an integer, a real number, and a percentage.

15. The system as recited in Claim 13, wherein each of said values has a type which is selected from the group comprising: a curve, and a limit.

16. The system as recited in Claim 15, wherein said curve is a plot.

17. The system as recited in Claim 15, wherein said curve is a tabular representation of a curve.

18. The system as recited in Claim 15, wherein said limit is a minimum limit.

19. The system as recited in Claim 15, wherein said limit is a maximum limit.

20. The system as recited in Claim 15, wherein said limit is a limit of noise in energy supplied from a corresponding one of said at least one energy supplier to said energy consumers.

21. The system as recited in Claim 15, wherein said limit is a limit of reactive power in energy supplied from a corresponding one of said at least one energy supplier to said energy consumers.

22. The system as recited in Claim 15, wherein said limit is a limit of an amount of power produced from renewable energy sources for energy supplied from a corresponding one of said at least one energy supplier to said energy consumers.

23. The system as recited in Claim 15, wherein said curve is a function of an amount of power to be supplied from a corresponding one of said at least one energy supplier versus time.

24. The system as recited in Claim 15, wherein said curve is a function of price for frequency stability versus frequency of power to be supplied from a corresponding one of said at least one energy supplier.

25. The system as recited in Claim 15, wherein said curve is a function of price for a change in power to be supplied from a corresponding one of said at least one energy supplier versus a percentage change in said power over time.

26. The system as recited in Claim 15, wherein said curve is a function of price for early start of power delivery from a corresponding one of said at least one energy supplier versus a time of said start of power delivery.

27. The system as recited in Claim 15, wherein said curve is a function of price for availability of power delivery from a corresponding one of said at least one energy supplier versus availability of said power delivery.

28. The system as recited in Claim 15, wherein said curve is a function of price for an overload or an underload of planned power delivery from a corresponding

one of said at least one energy supplier versus a deviation from said planned power delivery.

29. The system as recited in Claim 15, wherein said curve is a function of price for a distance between a corresponding one of said at least one energy supplier and said energy consumers versus said distance.

30. The system as recited in Claim 29, wherein said curve includes a step change in price at a corresponding value of said distance.

31. The system as recited in Claim 15, wherein said curve is a function of price of power or energy from a corresponding one of said at least one energy supplier versus an amount of said power or energy.

32. The system as recited in Claim 15, wherein said importance is a number ranging from about zero to about two.

33. The system as recited in Claim 9, wherein said energy supply specification includes a plurality of energy supply sub-specifications; wherein each of said energy supply sub-specifications includes an attribute having a curve and an importance value; and wherein said curve is a function of price for a commitment interval versus time for said energy coordinating body to commit to said proposal.

34. The system as recited in Claim 33, wherein said energy supply specification corresponds to one of said energy suppliers; wherein said one of said energy suppliers is committed to supply energy in accordance with said proposal; and wherein a price paid by said energy coordinating body for said commitment is determined from said curve and said time for said energy coordinating body to commit to said proposal.

35. A system for planning energy supply for energy consumers, said system comprising:

a first sub-system operatively associated with a first energy management system;

a plurality of second sub-systems, each of said second sub-systems being operatively associated with a corresponding second energy management system; and

a communication network between said first sub-system and said second sub-systems,

wherein each of said first and second sub-systems includes an interface for exchanging energy planning information between said sub-systems and for negotiating an energy supply specification for said energy consumers.

36. A system for planning energy supply for energy consumers, said system comprising:

a first sub-system operatively associated with an energy supplier having a plurality of energy sources;

a plurality of second sub-systems, each of said second sub-systems being operatively associated with a corresponding one of said energy sources; and

a communication network between said first sub-system and said second sub-systems,

wherein each of said first and second sub-systems includes an interface for exchanging energy planning information between said sub-systems and for negotiating an energy supply specification for said energy consumers.

37. The system as recited in Claim 36, wherein said energy supplier is a power plant having a plurality

of turbo sets; and wherein said energy sources are the turbo sets of said power plant.

38. A system for use by at least one energy coordinating body and a plurality of energy suppliers or energy management systems to plan energy supply for energy consumers, said system comprising:

means for receiving requests related to a proposed energy supply for said energy consumers;

means for generating requests for energy planning proposals responsive to said received requests and related to a proposed energy supply from each of said energy suppliers or said energy management systems;

means for generating energy planning proposals responsive to said requests for energy planning proposals from said energy suppliers or said energy management systems to said at least one energy coordinating body;

means for determining an efficient energy supply specification from said energy suppliers or said energy management systems responsive to said energy planning proposals;

means for generating energy planning offers responsive to said efficient energy supply specification for at least some of said energy suppliers or said energy management systems; and

means for generating acceptances responsive to said energy planning offers from each of said at least some of said energy suppliers or said energy management systems to said at least one energy coordinating body.

39. The system as recited in Claim 38, wherein said means for determining an efficient energy supply

specification includes means for generating an energy supply specification for each of said energy suppliers or said energy management systems, said energy supply specification including a plurality of energy supply sub-specifications having an attribute with a value and an importance value; means for determining a metric for each of said attributes; means for multiplying the importance value and the metric to determine an importance-adjusted attribute metric for each of said attributes; and means for adding the importance-adjusted attribute metrics for determination of said efficient energy supply specification from said energy suppliers.

40. An energy planning system for planning energy supply from a plurality of energy suppliers for energy consumers, said system comprising:

a communication interface to said energy suppliers;

a processor operatively associated with said communication interface;

a first routine executed by said processor for exchanging energy planning information through said communication interface between said processor and said energy suppliers; and

a second routine executed by said processor for negotiating an energy supply specification from said energy suppliers to said energy consumers.

41. The energy planning system as recited in Claim 40, wherein said first routine exchanges at least two messages between said processor and a corresponding one of said energy suppliers, said messages being related to said negotiated energy supply specification.

42. An energy planning interface to an energy management system for use in planning energy supply from an energy supplier for energy consumers, said energy planning interface comprising:

- a communication interface to said energy management system;

- a processor operatively associated with said communication interface;

- a first routine executed by said processor for exchanging energy planning information through said communication interface between said processor and said energy management system; and

- a second routine executed by said processor for negotiating an energy supply specification from said energy supplier to said energy consumers.

43. The energy planning interface as recited in Claim 42, wherein said first routine exchanges at least two messages between said processor and said energy management system, said messages being related to said negotiated energy supply specification.

44. A method of planning energy supply, said method comprising the steps of:

- employing at least one energy coordinating body;

- employing at least one energy supplier;
- receiving and coordinating requests for energy at said at least one energy coordinating body;

- exchanging energy planning information related to said requests for energy between said at least one energy coordinating body and said at least one energy supplier; and

negotiating an energy supply specification responsive to said requests for energy and from said at least one energy supplier.

45. The method as recited in Claim 44, further comprising:

employing a plurality of energy supply sub-specifications as said energy supply specification;
associating an attribute having a value and an importance value with each of said energy supply sub-specifications; and

employing said importance value to indicate how said at least one energy coordinating body or said at least one energy supplier rates the corresponding attribute in negotiating said energy supply specification.

46. The method as recited in Claim 44, further comprising:

employing one energy coordinating body as said at least one energy coordinating body;

employing a plurality of energy suppliers as said at least one energy supplier;

generating requests for proposals for said energy supply specification from said energy suppliers related to said requests for energy;

receiving said proposals;

evaluating said received proposals to select at least some of said energy suppliers; and

forming contracts between said one energy coordinating body and said at least some of said energy suppliers for said energy supply specification.

47. The method as recited in Claim 46, further comprising:

including a specification of energy services to be provided with said proposals for said energy supply specification; and
for each of said energy suppliers:
receiving and evaluating said specification of energy services,
determining whether said specification of energy services can be supplied,
calculating pricing for said specification of energy services, and
preparing a corresponding one of said proposals for said energy supply specification.

48. The method as recited in Claim 46, further comprising:

employing as said forming contracts step:
sending offers from said one energy coordinating body to each of said at least some of said energy suppliers; and

for each of said at least some of said energy suppliers:

accepting a corresponding one of said offers.

49. The method as recited in Claim 46, further comprising:

employing as said forming contracts step:
sending offers from said one energy coordinating body to each of said at least some of said energy suppliers; and

for at least one of said at least some of said energy suppliers:

providing a counter offer, and

forming a corresponding contract between said one energy coordinating body and said at least one of said at least some of said energy suppliers for said energy supply specification based upon said counter offer.

50. The method as recited in Claim 46, further comprising:

for each of said at least some of said energy suppliers:

supplying energy based upon a corresponding energy supply specification; and reporting performance of said supplying energy step.

51. The method as recited in Claim 50, further comprising:

reporting a variance between said corresponding energy supply specification and said supplied energy.

52. The method as recited in Claim 46, further comprising:

employing as said evaluating said received proposals step:

determining optimized plots for said specification of energy at said one energy coordinating body from said proposals; and

providing offers to said at least some of said energy suppliers based upon said optimized plots.

53. A method of planning energy supply, said method comprising the steps of:

employing at least one energy coordinating body;

employing at least one energy supplier;

receiving requests for energy from a global communication network at said at least one energy coordinating body;

employing said global communication network to exchange energy planning information related to said requests for energy between said at least one energy coordinating body and said at least one energy supplier; and

employing said global communication network to negotiate an energy supply specification from said at least one energy supplier and responsive to said requests for energy.

54. The method as recited in Claim 53, further comprising:

employing the Internet as said global communication network.